25X1

TOP SECRET

RCA-03/0013/69

Basic Imagery Interpretation Report

NATIONAL
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YENISEYSK ESV TRACKING FACILITIES

25X1

DEPLOYED COMMO/ELEC/RADAR FACILITIES
USSR
MAY 1969

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INSTALLATION/FACILITY NAME	COUNTRY
Yeniseysk ESV Tracking Facilities	UR

UTM COORDINATES	GEOGRAPHIC COORDINATES	
NA	58-26-40N 092-16-20E	25X1

MAP REFERENCE

25X1 AMS. Series 1301, Sheet 46, Scale 1:1,000,000

LATEST IMAGERY USED	NEGATION DATE (if required)
[redacted]	None

ABSTRACT

The Yeniseysk Earth Satellite Vehicle (ESV) Tracking Facility is one of a network of ten facilities that provide command/control for Soviet near space (orbital) events, and one of five facilities equipped to provide command/control for the Molniya communications satellite program.

Tracking and telemetry arrays and equipment at Yeniseysk are, with few exceptions, the same type of equipment found at other ESV and space tracking facilities throughout the USSR.

INTRODUCTION

The Yeniseysk ESV Tracking Facility is located at an elevation of approximately 50 feet, 3 nautical miles (nm) east of the center of Yeniseysk (Figure 1). The facility is located in flat, marshy terrain immediately adjacent to the west bank of the Yenisey River. The area is sparsely covered by growth of a combined coniferous and deciduous vegetation that does not appear to mask the radar line of sight.

When the facility was first observed in [redacted] the limited interpretability of the photography allowed only the identification of an interferometer and sufficient additional detail to determine that the facility was ESV-related. Since the initial coverage, the facility has developed into two distinct areas: a separately secured operations area and a surrounding support area. Photography of numerous high-resolution missions has made possible identification of all tracking and telemetry antennas in the operations area and a functional identification of a number of buildings in the support area. Significant operational components now located at Yeniseysk include two Flim Flam antennas, two Molniya antennas, three SHIP WHEEL antennas, six helical telemetry antennas of various configurations, and a new antenna of unusual design under construction. 25X1

HF communications antennas serving the facility surround the operations area. An additional HF communications facility that is probably passing ESV-related traffic is located 7 nm southeast on the west bank of the Yenisey River.

The secured operations area contains approximately 36 acres and the surrounding support area contains approximately 191 acres.

BASIC DESCRIPTION

Operations Area

Physical Features

For the purpose of this report, the operations area (Figure 2) is considered to be the separately secured area containing all the tracking/telemetry components at the facility. Thirty buildings are contained in the area with a total of 178,510 square feet of working space. Additional items included under the operations area description and located outside the secured operations area include two double and

three single day/night rhombic HF communications antennas (ten antennas), an interferometer, several equipment towers, and two probable operations-related buildings located in the support area.

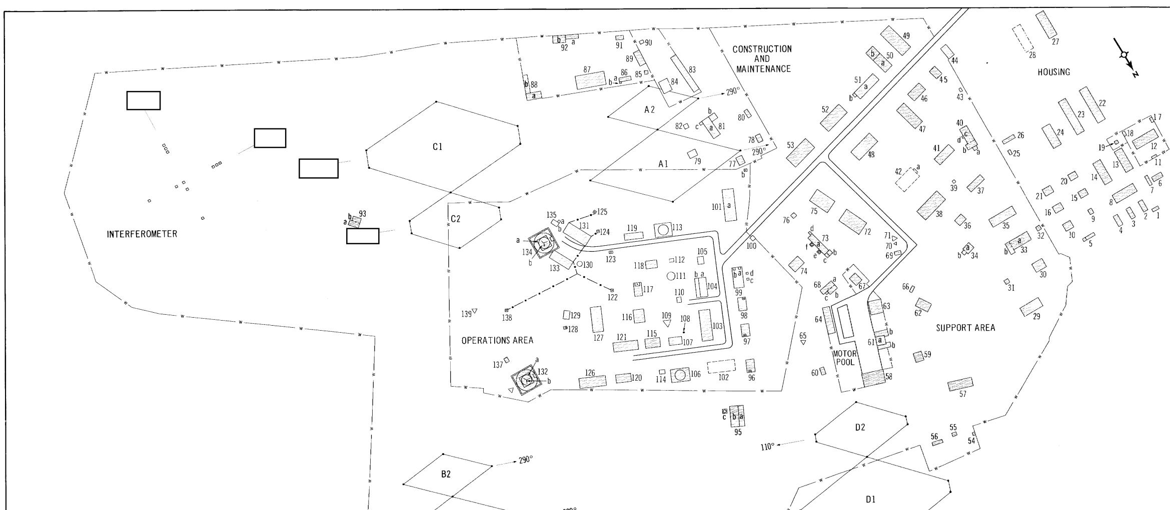
The largest individual electronics components in the operations area are the two Molniya communications satellite command/control buildings. These buildings (Figure 2, items 132 and 134) are spaced 25X1 apart. A parabolic dish antenna is mounted on an X-Y pedestal on the center of each building. The basic dish construction and size appear identical on both antennas, but current high resolution coverage has shown differences in the feed and secondary reflector structures. The northern-most Molniya antenna (item 132) has a tripodal-mounted, hyperbolic subreflector centered over a feed structure projecting through the primary reflector. The feed structure of the southern antenna (item 134) is significantly larger in diameter and height. On the tripodal subreflector support, there is a small dish antenna mounted over the subreflector. This arrangement is not unusual and is used on a number of antennas in the United States.

An additional electronic component is associated with Molniya operations by its location and connection to a Molniya support building. A 25X1 parabolic dish antenna (item 130) is located on a ground level mount next to the Molniya support building attached to the southern Molniya control building. Similar antennas were observed adjacent to each Molniya control building at the five Molniya facilities throughout the USSR. Most of these antennas have since been removed, including one that was adjacent to the northern Molniya building at Yeniseysk.

The other major system at the facility employing a dual antenna arrangement is the Flim Flam tracking control component which consists of two buildings located apart (items 106 and 113). 25X1
25X1 A dome is positioned on the center of the roof of each of these two buildings. During the construction phase of the various ESV facilities around the USSR, there were numerous occasions when Flim Flam buildings and their antennas were observed to be complete except for emplacement of the dome over the antenna. There were only two instances, at Plesetsk and Khutor, where photographic resolution was sufficiently high to identify the antenna. At these locations the Flim Flam antenna was identified as an approximately dish 25X1 antenna. Due to the identical function of all Flim Flam components, it is reasonable to assume that the Yeniseysk Flim Flam antennas are
25X1 also dishes.

Electronics systems located at Yeniseysk and common at other ESV facilities include three building-mounted SHIP WHEEL radars (on items 96, 97, and 98); one roof-mounted four-element helical antenna (on item 117); one type I five-element helical antenna (item 123); and one type II five-element helical antenna (item 124). Detailed drawings of these pieces of equipment are included in an earlier report.[1]

Electronic components that are unique to Yeniseysk are the two pedestal-mounted two-element helical arrays (items 122 and 138), located between the Molniya buildings, another two-element helical
25X1 array mounted on a lattice tower (item 125), and a probable antenna of a new configuration under construction (item 129). The three two-element helical antennas are connected by cable line to the telemetry control building (item 131). The type II five-element helical antenna is also cable connected to this building. It is probable that the type I five-element helical array is also connected to this building, but this cannot be confirmed at this time. The new probable antenna is located adjacent to its probable control building (item 127). The antenna is basically a horizontal rectangular plane 25X1
and elevated approximately off the ground. Striations crisscross 25X1
25X1



ANTENNA NO	DESIGNATION*	DESIGN FREQUENCY	AZIMUTH	PROBABLE CORRESPONDENT
A1	RG 65.1 Gost 6497-53 4	9.7 Mhz	[redacted]	Moscow
A2	RG 65 4.1 Gost 6497-53	16.1 Mhz		Moscow
B1	RG 65 4.1 Gost 6497-53	9.7 Mhz		Moscow
B2	RG 65 4.1 Gost 6497-53	16.1 Mhz		Moscow
C1	RGD 65 4.1 Gost 6497-53	9.7 Mhz		Moscow**
C2	RGD 65 4.1 Gost 6497-53	16.1 Mhz		Moscow**
D1	RGD 65 4.1 Gost 6497-53	9.7 Mhz		Moscow**
D2	RGD 65 4.1 Gost 6497-53	16.1 Mhz		Moscow**
E1	RG 65 4.1 Gost 6497-53	9.7 Mhz		Tyuratam
E2	RG 65 4.1 Gost 6497-53	14.3 Mhz		Tyuratam

*See document reference 4.
**Probable long-path antennas to same correspondent as antennas A & B.

ITEM	DESCRIPTION	DIMENSIONS (FT) L W H
	SUPPORT AREA	[redacted]
1	Storage bldg	
2, 3, 4	Bldgs (3)	
5	Storage bldg	
6	Bldg	
7	Bldg	
8	Apartment bldg	
9	Bldg	
10	Housing unit	
11	School-associated structure	
12	School bldg	
13, 14	Apartment bldgs (2)	
15, 16	Housing units (2)	
17	School-associated structure	
18	School-associated structure	
19	School-associated structure	
20	Housing unit	
21	Housing unit	
22, 23	Apartment bldgs	
24	Apartment bldg	
25	Bldg	
26	Bldg	
27	Apartment bldg	
28	Apartment bldg u/c	
29	Bldg	
30	Prob commo bldg	
31	Bldg	
32	Bldg	
33	Bldg	
a		
b		
34	Bldg	
a		
b		
35	Bldg	
36	Bldg	
37	Bldg	
38	Bldg	
39	Bldg	
40	Heat & power plant	
a		
b		
c		
d	Stack	
41	Bldg	
42	Bldg u/c	
a		
b		
43	Bldg	
44	Security bldg	
45	Athletic activities bldg	
46	Admin bldg	
47	Barracks bldg	
48	Barracks bldg	
49	Admin bldg	
50	Gym bldg	
a		
b		
51	Athletic activities bldg	
a		
b		
52	Barracks bldg	
53	Barracks bldg	
54	Bldg	
55	Bldg	
56	Bldg	
57	Bldg	
58	Motor pool bldg	
59	Bldg	
60	Bldg	
61	Firehouse	
a		
b		
62	Bldg	
63	Motor pool bldg	
64	Motor pool bldg	
65	Equipment tower	
66	Bldg	
67	Motor pool bldg	
68	Bldg	
a		
b		
c		
69	Bldg	
70	Equipment tower	
71	Equipment tower	
72	Bldg	
73	Heat & power plant	
a		
b		
c		
d		
e	Stack	
f	Stack	

ITEM	DESCRIPTION	DIMENSIONS (FT) L W H
74	Bldg	[redacted]
75	Bldg	
76	Coal conveyer shed	
77	Const & maint support bldg	
78	Const & maint support shed	
79	Const & maint support bldg	
80	Const & maint support bldg	
81	Const & maint support bldg	
a		
b		
c		
82	Const & maint support shed	
83	Const & maint support bldg	
84	Const & maint support bldg	
85	Const & maint support shed	
86	Const & maint support bldg	
a		
b		
87	Const & maint support bldg	
88	Const & maint support bldg	
a		
b		
89	Const & maint support bldg	
90	Const & maint support shed	
91	Const & maint support bldg	
92	Const & maint support bldg	
a		
b		
93	Interferometer support bldg	
a		
b		
94	Bldg u/c	
95	Heat & power plant	
a		
b		
c	Stack	
	OPERATIONS AREA	
96, 97	SHIP WHEEL bldgs (2)	
98	SHIP WHEEL bldg	
99	Telemetry bldg a, b, c, d - elevated antenna platforms	
100	Security bldg	
101a	Bldg	
b	Unoccupied pedestal	
102	Bldg u/c	
103	Communications bldg	
104	Bldg	
a		
b		
105	Bldg	
106	Flim Flam bldg Dome	
107	Bldg	
108	R-400 microwave tower	
109	Equipment tower	
110	Tower	
111	Underground fuel storage	
112	Bldg	
113	Flim Flam bldg Dome	
114	Bldg	
115	Bldg	
116	Bldg	
117	Four-element helix control bldg	
118	Bldg	
119	Bldg	
120	Bldg	
121	Bldg	
122	Two-element helical antenna	
123	Type I five-element helical antenna	
124	Type II five-element helical antenna	
125	Two-element helical antenna	
126	Bldg	
127	Control bldg	
128	Prob pedestal u/c	
129	New prob antenna	
130	Molniya associated antenna	
131	Telemetry control bldg	
132, 134	Molniya bldgs (2)	
a	Antennas (2)	
b	Subreflectors (2)	
133	Molniya support bldg	
135	Bldg	
a		
b		
136	Equipment tower	
137	Bldg	
138	Two-element helical antenna	
139	Equipment tower	

FIGURE 2. LINE DRAWING OF YENISEYSK ESV TRACKING FACILITY.

the face of the plane in both directions, dividing the entire face into a grid pattern of approximately [redacted] squares. A rectangular dark-toned band with an outside dimension of [redacted] and an inside dimension of [redacted] is centered on the plane. The antenna is apparently being assembled before placement on its probable pedestal (item 128). The pedestal is being constructed immediately north of the antenna, and a cable trench runs from a point near the pedestal construction into the probable control building. Positive identification of this construction is dependent upon its final configuration and placement.* An enlarged view of this activity is shown in an inset on Figure 2. An additional telemetry building (item 99) may have roof-mounted and adjacent platform-mounted arrays. The building is the same size as the quad-position telemetry building found at other ESV facilities. The building differs in having two probable roof antenna platforms on its southern end and two probable adjacent elevated platforms on its western side. The presence or absence of antennas on these platforms cannot be confirmed.

Other related electronic components are scattered throughout the operations, support, and surrounding areas. The interferometer located east of the operations area is probably inoperative or abandoned. The antenna pads are overgrown by brush and trees and in some cases are not visible. Several calibration/equipment towers are inside the facility perimeter (Figure 2). These towers and an additional tower 1.5 nm southwest of the facility cannot be specifically identified as to function. Two probable operations-related buildings are located in the support area. A building (item 30) surrounded by four probable antennas is in the northwest end of the secured support area. This is probably the VHF communications component present at most ESV facilities. A smaller structure (item 39) resembles domestic optical instrument shelters. It consists of a platform adjacent to a small building possibly housing the suspected instrument. A sliding roof would expose the instrument. The location of an optical device in a heavily trafficked area adjacent to a smoke-producing power house seems illogical but may be a possibility. Communications support for the facility consists of the aforementioned rhombic antennas and an R-400 microwave link. A list of antennas, frequency, azimuths, and probable correspondents is on Figure 2. Feed lines from the rhombics lead back to the communications building (item 103). The R-400 microwave tower (item 108) is adjacent to the communications building. Azimuths for the R-400 dishes cannot be ascertained on present coverage.

An additional notable feature of Yeniseysk ESV is the absence of certain equipment present at most other ESV facilities. The most prominent missing feature is a 16-element helical array and its associated building. This equipment is present at all other ESVs, except Moscow ESV where it may be under construction or remain unidentified because of poor coverage. The 16-element array is definitely absent from Yeniseysk. Another component found at some ESVs and not at Yeniseysk is the quad-position telemetry building. A possible reason for the absence of this equipment at Yeniseysk is the close proximity of Kolpashevo ESV (100 nm west) which has this type equipment.

Status and Activity

On initial coverage of the facility in [redacted] 25X1
[redacted] the interferometer was the only significant equipment identified as to function. Later coverage allows identification of components present in [redacted] and shows that two of the SHIP WHEEL radars were probably complete at that time. Components under construction included the Molniya buildings and the northernmost Flim Flam build-

*As of [redacted] the probable antenna can be confirmed. It has been placed on its pedistal and possibly has an electronic steering capability.

ing. Construction on the southern Flim Flam building started in 25X1
25X1 By the major components of the facility, such as Molniya and Flim Flam, were complete. Most of the helical telemetry antennas were also present at this time but were not identified until later higher resolution coverage. No significant changes occurred in the operations
25X1 area in the time period. In early activity increased, with 25X1
construction starting on several antennas and buildings. In 25X1
25X1
25X1 As of construction was incomplete 25X1
on the following items: a building foundation (item 102); the modification of a building in the southeast corner of the facility (item 101); and steamlines and cable trenches. Roads remain incomplete and only partially hard surfaced. Building material is stacked throughout the area, grouped mainly around construction activity.

Operational Functions

Functional responsibilities of the Yeniseysk ESV Facility cover a broad range. Principal components show that the primary activities are to support Soviet near-space events, to provide command/control, and to serve as a ground terminal/relay for the Molniya Comsat system. Additional programs relate to the geographic positioning of the facility in relation to Soviet missile test ranges. Yeniseysk is so located that ICBMs fired out of Tyuratam for impact at Kamchatka pass north of the facility, and IRBMs launched from Kapustin Yar impacting in Bratsk pass south of the facility. Thus the facility could and may provide support to ICBM and IRBM missiles firing out of their respective ranges. Equipment at Yeniseysk could receive telemetry dumps, determine the location of the vehicle, and provide command/control as necessary.

Support Area

Physical Features

The support area is divided into two separate sections. One section is inside the facility security fence and contains 64 buildings
25X1 with a total of of floorspace. This portion of the support area appears to contain those buildings related to facility operations and maintenance. Included in this section are maintenance and construction buildings, a motor pool, two heat and power plants with a third nearing completion, some buildings previously mentioned as operations-related, some administration buildings, a recreation field and gym; and three calibration/equipment towers. The second section of the support area is located outside the western security fence. This section contains living quarters for facility personnel and their dependents as well as a school and individual garden plots. There are five large apartment buildings, another nearing completion, and a foundation being laid for another. An additional 12 buildings serve as individual housing units and as probable dispensary/administration spaces. The 28 buildings in the housing section contain a total of
25X1 of floorspace.

Status and Activity

When first observed in the facility support consisted of a total of 19 buildings, nine in the housing section outside the security fence with one of the large apartment houses in initial construction phases, and the remaining ten in the secured section, with evidence that construction had started on five additional build-
25X1 ings. By the the housing section had been expanded to 17 buildings with the addition of three apartment buildings, a school, and four smaller structures. At the same time, the secured section of the support area had been expanded to 28 buildings. Both sections of the support area continue to be expanded to fulfill the needs of 25X1

the facility. At present, two buildings in the secured section and one in the housing section approach completion, and one building in each section is in midstages of construction.

Related Facilities

The Yeniseysk HF Communications Facility is located 7 nm southeast of Yeniseysk ESV Facility. This HF communications facility can be related to the ESV facility by the similarity in antenna azimuths.

[redacted]

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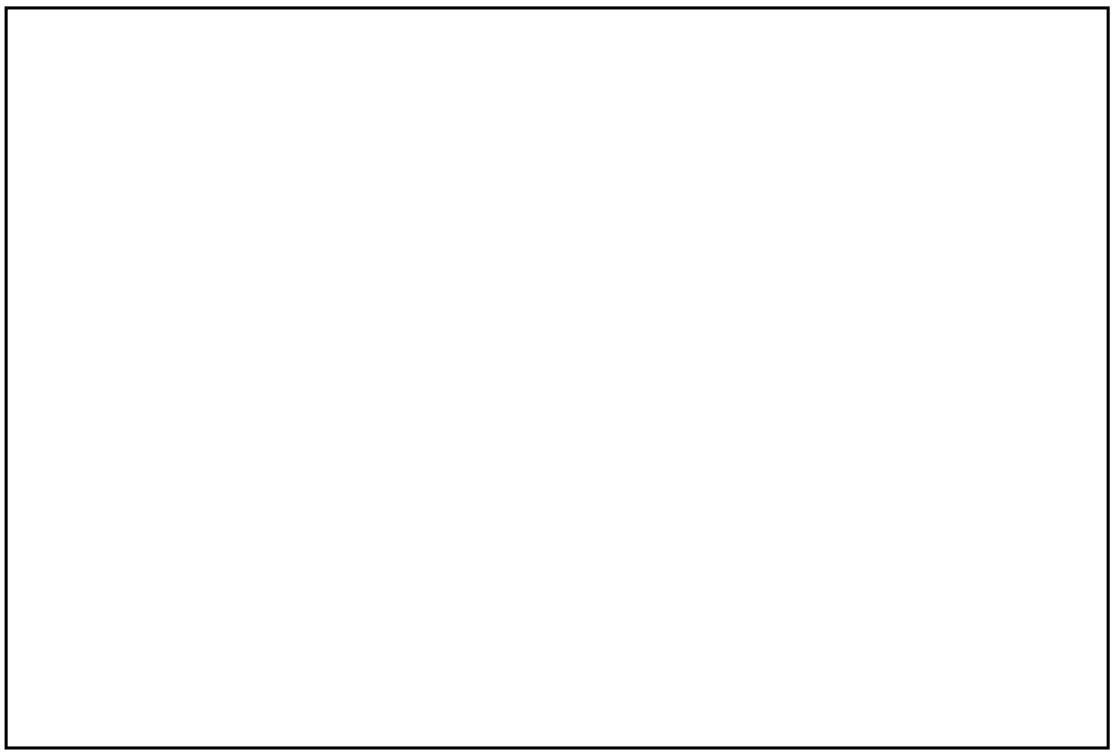
REFERENCES

IMAGERY



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MAPS OR CHARTS

AMS. Series 1301, Sheet 46, Scale 1:1,000,000

DOCUMENTS

25X1 1. FTD, Project BAND STAND Report No 25, 1 Jul 68, Revision 2 (TOP SECRET 25X1

25X1 2. NPIC, Sary Shagan ESV Tracking Facility, USSR, Nov 68 (TOP SECRET 25X1
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25X1 3. NPIC, Galenki ESV Tracking Facility, USSR, Feb 69 (TOP SECRET

4. Gost 6497053. Receiving Short-Wave Band Symmetrical Antennas, Moscow, 1956 (Published by the Committee of Standards, Measurements and Instruments under the USSR Council of Minister) (UNCLASSIFIED)

REQUIREMENT

COMIREX BR-C/002/69

NPIC Project 210181

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